



Transportation News

A Resource for Military Transportation Engineers



Volume 23, April 2002

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Air Force Engineering Mission in Antarctica

By Joe Sopko, Air Force Air Mobility Command

Air Mobility Command (AMC) has been providing support of the National Science Foundation's Antarctic Program since 1956. This service has increased over the years, with flights carrying cargo and personnel between Christchurch, NZ and McMurdo Station, located at the edge of the Ross Ice Shelf in Antarctica.

Much of the routine on-continent (Antarctic) missions are flown by ski-mounted LC-130 aircraft operated and maintained by the New York Air National Guard (109th). As the research intensity at the remote stations on Antarctica increased, including construction of a totally new, highly sophisticated facility at the South Pole, the demands for LC-130 missions from McMurdo increased substantially.

Since the number of the LC-130's available is quite limited (due to the limited number of aircraft, the long flight from Christchurch and unpredictable weather conditions), the only alternative to maintain or increase the desired number of missions on the continent was to use conventional wheeled aircraft. Wheeled aircraft flights have been completed in the past in Antarctica, using ice runways for landings and takeoffs.

While there is certainly an abundant supply of sea and glacial ice that is potentially suitable for landing wheeled aircraft, there can in parts of Antarctica be a problem associated with combined warmer temperatures and intense 24-hours of sun during the austral summer (September 21 through March 21). In the McMurdo area during the winter, from March until September, the temperatures are so cold, reaching -80 degrees F, it is virtually impossible to operate any type of aircraft due to mechanical systems limitations. Flight then can only be attempted during the summer, when sunlight and much warmer temperatures prevail.

Early in the summer it is possible to land the wheeled aircraft on either the glacial or the sea ice. As the summer progresses however, the 24 hours of intense solar radiation initiate a melting process on the surface of the ice, making it difficult if not impossible to land aircraft on either the glacial or sea ice runways. The most effective method for reducing or eliminating the surface melting is to install a light-

(Continued on Page 2)



Previous to Air Force study skid-mounted aircraft were typically used for flying in and out of Antarctica

Air Force Engineering Mission in Antarctica (Cont'd)

colored reflective coating or surface directly on top of the ice. Such a coating would reflect, not absorb the solar radiation. The most effective reflecting surface known in cold climates is readily available in Antarctica, snow. Engineers from the U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory (CRREL) have studied the reflective properties of snow and indicated that it could theoretically be used as an ideal reflective blanket on the ice runways.

The concept of increasing the length of time to use the ice runways with a compacted snow blanket for insulation was presented to the Command Pavement Engineer for Air Mobility Command at Scott Air Force Base, Illinois. The concept of a compacted snow runway surface during the austral summer, to avoid melt problems and thereby yield a longer useful runway period of time would have an immediate positive impact on Air Mobility Command's mission of providing air lift capabilities to the Antarctic.

The process of landing heavy, wheeled aircraft on snow had never been accomplished within the US Antarctic Program with any degree of reliability. Prior to risking aircrews or aircraft to complications that could result from failure of the snow blanket, AMC requested that a testing and verification process be completed prior to the operation of wheeled aircraft.



Engineering team runs tests for determining feasibility of landing wheeled vehicles in Antarctica

A testing program was initiated in November 2001. Engineering team members convened at McMurdo Station in Antarctica to develop the study. The required correlation was completed and a wheeled C-130 aircraft was permitted to land on the compacted snow. The results showed that there was no rutting or failure of the snow surface on the runway. Taxiing in the weaker test sections off the runway did show minimal surface damage and helped verify the fail/no-fail strength boundary. Extrapolation of these C-130 results, and evidence from a heavy proof roller were used to establish that the runway strength was suitable to permit the landing of the much larger C-141. With the initial success of the testing program with the C-130, AMC scheduled C-141 flights for mid to late January 2002.

As the landing date for the C-141 approached continuous monitoring and maintenance of the two- to three-inch layer of compacted snow took place on the Pegasus Runway. Off the end of the runway, in the test sections, the snow was left in its slightly lower strength condition in an effort to actually induce tire penetration and rutting. While the

C-141 would not land on this section, it would be permitted to taxi in several different patterns. The engineers purposely wanted a weak zone so that they could measure the tire rutting and then test this weaker snow with the DCP. The purpose of this exercise was to establish what DCP readings were not sufficient enough for aircraft operations due to insufficient compaction.

The C-141 landed on January 29, 2002 marking the first time ever that a heavy US aircraft landed on compacted snow. As the aircraft landed and taxied on the runway, one of the team's engineers was transported to the aircraft on a snowmobile, boarded the aircraft and instructed the pilot to taxi over the prepared test sections. After the taxi was complete, the team followed the plane's path and recorded the tire penetration and also performed DCP tests.

Preliminary results showed negligible rutting on the runway, and minimal rutting in the test sections. The data from this test was immediately analyzed and the team forwarded a message back to AMC headquarters, "MISSION COMPLETE." The engineering team had completed this crucial mission in a nine-month period. In fact the project was so successful that additional C-141's landed during the same week.

This huge success permitted AMC to continue testing using the C-17 Globemaster III. Although tire pressures on the C-17 are less than on the C-141, the C-17 is much heavier and there was concern that it would plow through and severely damage the compacted snow layer when braking during landing operations. This concern was based on experiences during previous testing on soil runways. A successful C-17 landing in mid February dispelled these concerns.

This project is considered by agencies associated with it to be highly successful and a prime example of the quality and expediency possible when mission accomplishment and teamwork are readily established as the highest priority. Q

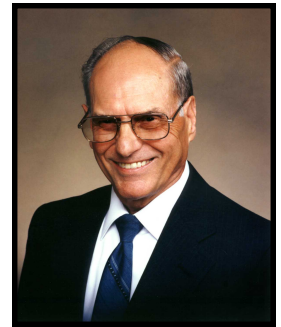


Successful completion of the study determines that the C-17 can land safely in Antarctica

Corps Loses Long Time Paving and Materials Engineer

William “Bill” R. Coy, 44-year paving and materials engineer veteran with the U. S. Army Corps of Engineers, passed away 22 September 2001 in Omaha, NE. A beautiful service was held for Bill with his grand daughter, Sheridan Zuther, singing heart warming a cappella renditions of “Amazing Grace,” “I Want Jesus To Walk With Me,” and “America the Beautiful,” and his son, William “Chip”, Jr, giving the eulogy.

Bill was born in Omaha, NE on 28 November 1923. He began his career with USACE, Omaha District, in 1943 working both in Omaha and Minot, ND. It was in Minot that he found his bride, Geraldine Zabackon, to whom he remained happily married to for over 57 years.



Bill Coy, former USACE employee

During World War II, Bill served in the U. S. Navy and returned to the USACE in 1946 working at the Garrison Dam in North Dakota. In 1952 he became involved in the U. S. Air Force Airfield Paving Program and engaged in the construction of U. S. Air Force airfield projects in Texas, Oklahoma and New Mexico.

In 1960 Bill became involved in the Corps’ Ballistic Missile Construction Program with missile sites in New Mexico and two minuteman sites in North Dakota, where he was Chief of Geology, Soils and Materials. After completion of the missile site construction in 1965, he was the Resident Engineer during the construction of the Green River Dam Reservoir near Campbellsville, KY.

In 1968 Bill transferred to the Corps’ Missouri River Division Laboratory. As Chief of the Concrete and Materials Section, he was responsible for asphalt and concrete paving mix designs, testing of aggregates, joint sealants and other construction materials and conducting inspections of commercial and contractor testing laboratories in a 14 state area.

In 1978 Bill became the Division Materials Engineer for the Missouri River Division, where he was responsible for reviewing project designs and providing technical consulting to the field for materials related requirements for civil works and military projects. In 1987, HQUSACE established three mandatory technical review centers: the North Pacific Division, the Missouri River Division, and The South Atlantic Division. Bill was responsible for the review of airfield pavement projects within the Missouri River, North Atlantic, New England and Southwestern Divisions. The review centers eventually evolved into the USACE Transportation Systems Center.

Bill retired in 1988 after 44 years of distinguished Federal service. He received numerous awards and commendations including the Meritorious Service Award from the Air Force in 1965 and the Commander’s Award for Civilian Service from the Army in 1987. After his retirement, he worked part time for the National Institute for Standards and Technology (NIST) inspecting commercial laboratories throughout the U. S. He served as a Special Consultant to the Transportation Systems Center providing instruction for a Hot Mix Asphalt (HMA) Paving Workshop, developing checklists for the inspection of asphalt and concrete airfield pavement projects, and providing inspection of asphalt and concrete batch plants and airfield paving projects in Egypt. Bill also provided consulting services to Corps Districts for concrete civil works projects.

Terry Sherman, Director of the Transportation Systems Center, remembers the impact that Bill had on his career. “I was very fortunate to follow Bill in his last two assignments with the Corps of Engineers as Chief of the Concrete and Materials Section, Missouri River Division Laboratory and as Division Materials/Paving Engineer, Missouri River Division. When I was at the MRD Lab and he was at the Division office, he was always available to provide guidance and help resolve any technical problems. He taught me how to inspect commercial and contractor testing laboratories. The checklists and report format he developed to inspect laboratories were exceptionally complete and are still being used today. As a laboratory inspector, Bill was unmatched by anyone within the Corps. Bill was an exceptional engineer with an exceptional and unsurpassed ability to communicate with Contractors, whether it was identifying laboratory testing deficiencies or failure to comply with contract specification requirements. He was always able to communicate in a remarkably non-adversarial and friendly way that efficiently and effectively resolved and corrected the problem. Bill was a friend and a mentor. I am a better engineer and a better person for knowing him. I will miss him. I will miss his friendship and his counsel. I will mostly miss his bright and friendly smile and miss his “Hello, Terry! It is so nice to see you!”

Two daughters, Sandra and Cheri, precede Bill in death. He is survived by his wife, Jeri; one daughter, Carol Zuther of Martin, ND; four sons, William, Jr. of Omaha, Russell of California, MO; Steven of La Jolla, CA and Marcus of San Jose, CA. He has eleven grand children and six great grand children. Q

USACE Raises SPiRiT

It's a concept, a philosophy, a management principle, a different holistic way to approach planning, design and construction...It's Sustainable Design and Development (SDD). By now, you probably have heard the term SDD. All Federal Agencies have been directed by Executive Order to develop and adopt SDD practices in the design and construction of Army facilities. It's sure to be a part of the Corps' business process for design. SDD means integrating the decision-making process across Army installations, basing every decision on the greatest long-term benefits – eliminating the concept of waste – thinking “cradle-to-cradle” – building on natural processes and energy cycles – recognizing the interrelationship of installation actions with the natural world.

To help integrate SDD into projects US Army Engineering Research and Development Center in coordination with Green Building Council developed the Sustainable Project Rating Tool (SPiRiT). SPiRiT is a process for considering and scoring sustainability of projects and rate against standards “Bronze, Silver, Gold, Platinum”. Army goal is to achieve a minimum “Bronze” rating for all projects.

For more information on SDD check out the web sites at

www.cecer.army.mil/SustDesign and www.hqda.army.mil/acsimweb/fd/linksSDD.htm. Q

A successful person is one who can lay a firm foundation with the bricks that others throw at him or her.

*David Brinkley
(television journalist)*

Source: *Communication Briefings*, August 2001, Vol. 20, No. 10, 1101 King Street, Suite 110, Alexandria, VA 22314 Q

SDD Practice Makes Perfect

The Construction Engineering Research Laboratory (CERL) and the Savannah District have teamed up to provide a show-case parking lot for Fort Bragg, North Carolina. In the past, most of the focus and examples for Sustainable Design and Development (refer to the article to the left *USACE Raises SPiRiT* for more information on SDD) have been on vertical construction, not civil engineering applications. The Fort Bragg project incorporated a large number of SDD concepts into a small project to demonstrate construction of the different ideas. A design charrette was completed and future newsletter articles will discuss the concepts adopted. In the mean time, here are SDD areas with civil engineering applications that should be considered in projects:

- Q Reduce the amount of hazardous materials required, i.e. SS-S-1614 (ASTM D 3405), pavement joint sealant material.
- Q Provide designs that minimize the amount of storm water run-off and increase the amount of infiltration. The Fort Bragg project will incorporate bioinfiltration swales and pervious pavement.
- Q Reduce energy use when ever possible.
- Q Recycle existing asphalt pavement materials into a base course or shoulder surfacing material. As a minimum, have the contractor haul the material to a central recycling plant.
- Q Provide better facilities for bike and pedestrian traffic, to encourage other forms of transportation.
- Q Landscape parking lots for shade.
- Q Use permanent marking for parking stalls to reduce maintenance requirements.

For more information contract Dan Boyer, Transportation Systems Center at (402) 221-7266 or e-mail dan.j.boyer@usace.army.mil. Q

What's Wrong with this Picture?



Read on to find the correct answer...

Guide Specification Updates

The following guide specifications have been updated and are available on the TechInfo web site at www.hnd.usace.army.mil/techinfo. Here's a description of the changes you can expect to see now and in the future.

UFGS 02749, Hot-Mix Asphalt for Airfields

The Airfield Hot Mix Asphalt User/Producer Group consisting of representatives from the Tri-Services, FAA, National Center for Asphalt Technology, Asphalt Institute, and industry reviewed the joint Tri-Services/FAA specification, UFGS 02749, in January 2002. Revisions proposed and adopted include: 1) expanding the "Note to Designers" regarding selection of Performance Graded (PG) asphalt cement, 2) changing the compacted mat and joint density basis from Marshall density to theoretical maximum density (ASTM D 2041) and 3) including a lump sum or unit price measurement and payment option.

UFGS 02753A, Concrete Pavements for Airfields and Other Heavy Duty Pavements

This guide specification was revised to address evaluation and mitigation of potential Alkali-Silica Reactivity (ASR). The changes are located in Part 2, Materials, of the specification and require a three-step process to evaluate and mitigate ASR potential:

- Q Step 1. Test both fine and coarse aggregates for reactivity in accordance with ASTM C 1260, "Potential Alkali Reactivity of Aggregates (Mortar-Bar Method, Step 2). Non-ASR susceptible aggregates are defined as having a mortar-bar expansion equal to or less than 0.08 percent at 16 days after casting.
- Q Step 2. If the aggregates exceed the 0.08 percent criterion, the Contractor has the option to submit new aggregates or conduct "modified" ASTM C 1260 testing using the proposed aggregates and job cement in combination with Class F fly ash or Grade 120 Ground Granulated Blast Furnace Slag (GGBF slag). Again the same 0.08 percent criterion is used.
- Q Step 3. If the proposed aggregate and the job cementitious materials pass the modified C 1260 criteria, the mix design is conducted using the same proportions of cementitious materials as determined from Step 2.

UFGS 02753A is also undergoing a major revision by an Air Force, Army and Navy Tri-Services committee. The goals are to streamline the specification, update numerous paragraphs (including the ASR provisions, as noted above), and include tailoring options for Navy use. The plan is to incorporate review comments and other revisions into a final draft by 30 April 2002 and conduct final Tri-Services review by 30 June 2002. After final review and approval by the Tri-Services committee, the specification will be distributed for industry review and coordination.

For more information contact, Rick Donovan, Transportation Systems Center, (402) 221-7269 or e-mail richard.l.donovan@usace.army.mil. Q

Poly-Jet LOX Passed the Test

Poly-jet LOX has successfully completed the USAF testing/approval process. According to guidance dated 21 November from HQ AFCESA, Poly-Jet LOX, manufactured by W.R. Meadows, may now be used as a joint sealant in liquid oxygen (LOX) areas. It is currently the only Air Force-approved LOX compatible joint sealant available on the market. Other products will be allowed when they complete the USAF testing approval process.

HQ AFCESA, the Air Force Safety Center (AFSC) and US Army Engineer Research and Development Center (ERDC) recommend the following:

- Q For new construction in LOX areas, use continuously reinforced concrete pavements to eliminate as many joints as possible.
- Q For joints in LOX areas, use the Air Force-approved Poly-Jet LOX compatible joint sealant.
- Q If the above recommendations cannot be followed, leave the joints in the LOX areas unsealed. Take great care to keep debris out of the joints since debris can also be shock-sensitive when exposed to LOX.

For more information contact Dr. Randall Brown, HQ AFCESA/CESC at (850) 283-6338 or e-mail randall.brown@tyndall.af.mil. Q

Guidance for Preventing Failure

Want to prevent catastrophic failure of asphalt edge pavements? Refer to Engineering Technical Letter (ETL) 01-5, *Jet Engine Thrust Standoff Requirements for Airfield Asphalt Edge Pavements*, issued by HQ AFCESA in May 2001. The ETL presents the standoff distances from jet aircraft during engine run-up required to prevent uplift forces on asphalt pavement edges. Guidance came as a result of failures at multiple locations resulting in damage to aircraft, vehicles, and property. The ETL can be viewed at www.afcesa.af.mil/Publications/ETLs/ETL%2001-5.pdf. Q

Changing Processes at USACE

To respond to the changing world, national needs, technology and the work force the Corps of Engineers is taking steps to transform into a corporate, client-focused, team-based, learning organization. In other words, adopting the objectives of the Project Management Business Process (PMBP). Implementation of the PMBP will create an environment in which all work is accomplished by project-focused teamwork of cross-functional individuals and customers, working together to deliver a quality product that meets the users needs. Implementation of the PMBP will take place over the next few years. For more information on the Corp's PMBP or a copy of the Engineering Regulation, ER 5-1-11, *U.S. Army Corps of Engineers Business Process*, visit the web site at www.hq.usace.army.mil/pmbp2. Q

Wanted – DA Interns

In the past the Transportation Systems Center has hosted Department of the Army (DA) Interns and found it to be a very beneficial relationship. In the past year, four DA interns have toured through the TSC; Matt Bird and Bryan Flere from the Omaha District and 2 borrowed from the Mobile District, Angela O'Connor and Tammy Jilcot (for more information on Angela and Tammy's tour in Omaha refer to Volume 22 of *Transportation News*). The TSC benefits from the interns fresh and innovative ideas and they were afforded the opportunity to learn more about pavements. If you or someone you know in the DA Internship program are interested in sharing knowledge with the Transportation Systems Center contact Terry Sherman at (402) 221-7260 or e-mail terry.w.sherman@usace.army.mil. Q

Better Business Practices Will Avoid Problems Down The Road

The Transportation Systems Center (TSC) looks forward to USACE implementing the PMBP (see article to the left *Changing Processes at USACE*). The PMBP promises to deliver quality projects, which is the foundation of the TSC's and other Centers of Expertise's (CX) existence. In the current systems, for whatever reason, costs for CX services are not being budgeted in project costs. According to Terry Sherman, Director of TSC, "Customers are very satisfied with the costs and benefits of TSC reviews, but want them included in the original design estimate. One complaint that we receive from many of our Air Force customers is that funding for the TSC reviews is not always included in many of the original design budgets and the customer then has to send additional funding, which may not be available at that time. The customers want to send funding only once."

For most airfield and railroad projects, TSC review and participation are the most efficient use of limited resources because it results in a quality project that meets customers' needs and expectation. There have been examples in the past where TSC review was not provided and the customer was not satisfied with the product. The customer's first question is, "Why didn't the TSC review this project?" There have also been numerous airfield construction projects where the TSC was not consulted by the District to help resolve construction problems. This has been significantly reduced in the past year with the HQUSACE policy requiring Airfield Paving Workshops before each airfield project over \$5M, meeting twice a year with the Air Force to discuss any current airfield design or construction issues, and encouraging the use of TSC construction support services.

MCXs and CXs are very effective and efficient in providing exceptional value added services to each and every project within their areas of expertise. They maintain state-of-the-art world-class expertise and their participation helps mentor many of the younger engineers and technicians involved in the design and construction of Corps projects. With the implementation of the PMBP the appropriate MCXs and CXs will hopefully be a critical member of every Project Delivery Team and thusly provide the best product for the customer. Q

Article Available for Justifying Initial Costs

In the last 10 years the Army has recognized the importance of internal pavement drainage and emphasized its use. Quantifying the benefits of a good drainage design can be difficult and thus justifying additional initial cost disheartening to pavement engineers dealing with budget problems on projects. The article "Integral Collector Drains – Prolonging Service Life by Removing Moisture", *CE News*, February 2002, attest to the cost effectiveness of incorporating drainage layers and supports the Army criteria. For a copy of the article check out your local library, most USACE libraries carry *CE News*. For more information contact Dan Boyer at (402) 221-7266 or e-mail dan.j.boyer@usace.army.mil. Q

Corps Employee Finds His Way Back Home

After ten years in private practice Rick Donovan has returned to the U.S. Army Corps of Engineers. Rick, a geotechnical and paving materials expert found his new home with the Transportation Systems Center (TSC). He brings with him 35-years of experience in testing, design, construction, and maintenance of water resources, MILCON, and waste management facilities. Rick has a bachelor's degree in Civil Engineering and a master's degree in Geotechnical Engineering and has worked in the Omaha District, the former Missouri River Division (MRD) laboratory, and the former MRD division office. He has been involved in geotechnical and materials engineering for major MILCON programs including the Safeguard, Minuteman III and Peacekeeper missile defense systems; the Air Launched Cruise Missile (ALCM) program; and the B-1 and B-2 bed downs. In his ten-year absence from the Corps, Rick was in private practice, working on railroad intermodal yards and airfield paving projects.

Rick and his wife Mary have been married for 26-years and Rick not only recently changed jobs but moved his home at the same time. Luckily Mary, Rick's wife for the past 26-years, survived all the changes. Their new home is being broken in with visits from their two married daughters, Cindy and Kym, and four grandchildren: Jake, Conner, Ellie, and Alexa. Rick's hobbies, since moving into a new home, include shopping at Home Depot and installing shades, drapes, and pictures.



Rick Donovan (lower right) with his wife, Mary, 2 daughters, Kym and Cindy and their husbands, and 1st grandchild, Jake.

The TSC made Rick promise to never leave again, for what would they do without him? Or a better question - how did they manage without him, before he joined the team? Rick writes about his move, "What I most missed during those years [in private practice] was the talent and depth of experience available within the Tri-Services. In my current position, I have the opportunity to revisit old friends, meet new ones, and share their experiences with our Tri-Services transportation community." Q

Nationwide Poison Hotline 1-800-222-1222

Anyone facing a poison emergency can now get help by calling a toll-free hotline that links callers from anywhere in the country to medical experts at local poison control centers. Whether you are at home, work or traveling in an unfamiliar city, you can get helpful information 24 hours a day.

Source: Omaha District's Federal Occupational Health Unit Q

Kudos to...

Jim Lesto, Southern Division, Naval Facilities Engineering Command received a letter of appreciation from the NAVFAC, Engineering Innovation and Criteria Office for the excellent technical support he provided for the FY 01 NAVFAC Aircraft & Aviation Criteria program. Jim assisted in the validation of the alpha and beta testing of the new PCASE2.0 desktop software. As stated in the letter, "Jim is truly a team player who brought significant leadership to the process".

Dan Boyer, Senior Pavement and Railroad Engineer with the Transportation Systems Center received a letter of appreciation from the Seattle District for his active participation in the technical evaluation of the Fort Lewis deployment facility proposals. James Clark, Seattle District writes, "Selection Board members were not only impressed with your knowledge of railroad technical specifics, but commented upon your willingness to assist the selection board in the overall proposal evaluation process, including qualitative discussions of proposal merit, documentation of deliberations, and identification of proposal betterments and perceived deficiencies. Given the magnitude and complexity of the project, your contributions in helping complete the evaluation in one week were greatly appreciated."

Dan Boyer also received a Letter of Commendation from Major General Griffin, HQ USACE for his review of the Federal Transit Administration's (FTA) East Side Access project. General Griffin writes, "Mr. Boyer's technical skill in railroad engineering and his leadership were instrumental during this intensive review in a very restricted time frame." General also writes, "The efforts of Mr. Boyer and the entire Corps-wide review team were outstanding and, as a result, may lead to additional work with FTA."

Did you or someone you know receive an award for transportation-related work? We'd like to acknowledge the hard-working individual and give them a Kudo too. Send your Kudo acknowledgements to Mary Adolf at mary.j.adolf@usace.army.mil. Q

AMC Design Review Requirement Re-Issued

In 1998, HQ Air Force Air Mobility Command (AMC) issued a memorandum requesting all major (over \$1M) airfield pavement projects be reviewed by the Transportation Systems Center (TSC). The letter was directed toward O&M projects. However, in a new memorandum, AMC recommends TSC review for projects managed by all other entities, such as the Navy or at the local level. In addition, AMC recommends reviews for all electrical-related work. In the memorandum AMC states, “We believe this practice [of requiring TSC review] has been extremely successful in ensuring designs of technical adequacy as well as saving the Air Force literally hundreds of thousands of dollars. One prime example was their suggestion to change the gradation of the required drainage layer on a large apron project. This recommendation allowed the spacing of the under-drains to be widened and saved the Air Force over \$250K. Another less obvious example is the small number of change orders we have encountered during construction on projects they have reviewed. While it is difficult to put an exact dollar figure on this, we know the savings to the Air Force are significant.” Q

Use of Steel Reinforcement in Plain Concrete Airfield Pavements Containing Utility Blockouts

The airfield pavements for a utility upgrade project, such as hydrant refueling pits, storm drain inlets, and certain types of flush lighting fixtures, typically are replaced as isolated slabs for the utility blockouts and rows of slabs for the piping runs between the blockouts. Typically, these blockouts are penetrations through the concrete pavement and require reinforcing.

UFC 3-260-02, *Pavement Design for Airfields*, Chapter 13, Paragraph 6e, provides guidance and requires that the slab containing the utility blockout be reinforced. The reinforcement is mandatory to control or minimize the effects of cracking. The reinforcing steel holds cracks tightly closed, thereby preventing spalling at the edge of the cracks and progression of the cracks into adjacent slabs. Reinforcement for these conditions consists of 0.05 percent steel in two directions normal to each other. No reduction in pavement thickness is permitted for this level of reinforcement.

Other conditions that warrant reinforcement:

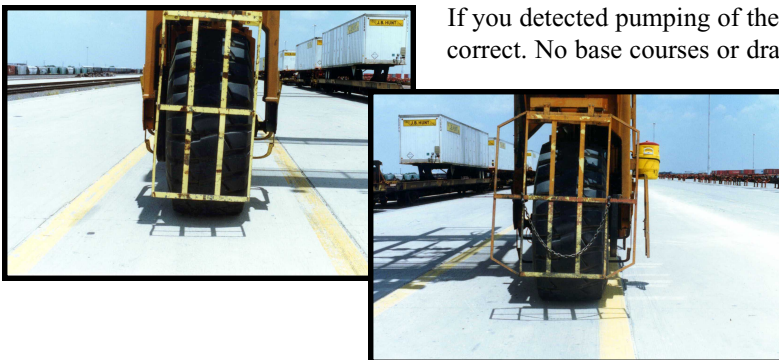
Q If the replacement airfield pavement slabs are drilled and doweled into the existing pavement to provide load transfer for both new and existing pavements, the new pavement will be exposed to the development of sympathetic cracking from the migration of cracks in the existing slabs. Depending on the condition of the existing adjacent slabs, reinforcement of the new slabs should also be considered.

Q Mismatched joints between new and existing pavements should be reinforced as described in UFC 3-260-02, Chapter 13, Paragraph 6.c(1).

Note that in both the utility blockout and pavement slab applications, the purpose of the reinforcement is to control the effects of the cracking, i.e., spalling along the crack edges. In general, the reinforcement holds the cracks tight and no repair is required, as described in TM 5-822-9/AFM 88-6, Chapter 10, *Repair of Rigid Pavements Using Epoxy Resin Grouts, Mortars and Concretes*. If a repair is desired, a determination is required as to whether the crack is “working.” Working cracks should be routed and sealed with joint sealant. Epoxy repairs should not be used on working cracks, as the epoxy repair could debond, or transfer the stress to an adjacent area and initiate a new crack.

For more information contact Rick Donovan at (402) 221-7269 or e-mail richard.l.donovan@usace.army.mil. Q

What’s Wrong with this Picture



If you detected pumping of the lime modified subgrade in the photo on page 4 you are correct. No base courses or drainage layers were used in this pavement section and no load transfer devices were used between the 8-inch vehicle pavement and 17-inch straddle crane lane. The cause of the pumping was due to overloading the pavement by piggy-packers (huge forklifts) and straddle cranes on the 8-inch thick pavement. Thoughts are that the 8-inch pavement was designed for over-the-road tractor-trailers, piggy-packers were not anticipated in the traffic mix, and the straddle crane lanes were too narrow for the cranes to actually use. Q

Fort Campbell Relies on RAILER to Manage Track

By Dana Finney, ERDC

When Audie Hardin needs to know anything about the Fort Campbell, KY, railroad track, he pulls up his RAILER database instead of driving all over the county to look at it. “The database has every bit of information I need for seeing how the track’s condition has been in the past and to project what it will be in the future,” said Hardin, Chief of Engineering and Design in Fort Campbell’s Public Works Business Center (PWBC). “It gives me hard core, firm data that I can use to leverage my command group and FORSCOM for the dollars we’re going to need to make repairs.”

RAILER – the Railroad Maintenance Management System – is one of several engineering management systems (EMS) developed by the U.S. Army Engineer Research and Development Center’s Construction Engineering Research Laboratory (CERL). It provides managers with a detailed track inventory; inspection, condition, and work history; and a maintenance and repair (M&R) needs assessment, which allows them to develop M&R plans.

EMSs use condition indexes that provide a rating of 0-100, with 0 being failed and 100 free from all visible defects. Based on annual inspection data, the systems produce the condition index rating. These ratings suggest the score at which it is most economical to do M&R projects, which ensures best possible use of limited funds. RAILER also uses the Army Railroad Track Standards for condition assessment. The indexes and track standards provide complementary assessments of both short- and long- term condition trends on which to plan work. “It tells me where to use the money wisely to get the most bang for my buck,” said Hardin.

RAILER includes a geographic information system (GIS) that generates maps matching color codes in the Installation Status Report. These maps show track condition at a glance, giving managers a powerful tool in budget meetings.

Fort Campbell began using RAILER 6 years ago. The PWBC is responsible for some 40 miles of track on- and off-post, which is used to mobilize support equipment for the 101st Airborne Division. According to Shirley Ezell, Traffic Manager in the Readiness Business Center, a unit training deployment requires about 200 rail cars to transport equipment, including humvees, trucks, tankers, wreckers, engineering support, and so on. “Fort Campbell is a premier power projection platform for deployment. Our marshaling area can hold 900 to 1,000 pieces of rolling stock,” said Ezell.

To fully take advantage of all RAILER’s features, Hardin taps into resources at Corps of Engineers CERL, Louisville District and Transportation Systems Center (TSC). Track experts at CERL provide inspection, database updates, and M&R planning consultation, while the district and TSC help with the business side.

Louisville can locate contractors to do the repair work and can sometimes secure installation support dollars based on the work that RAILER says is needed. TSC provides contracting support. According to Dan Boyer, railroad engineer at TSC, “We have an indefinite delivery-type contract in place that can be used to support any Army or Air Force installation.”

In producing delivery orders, Hardin especially likes RAILER’s GIS feature. “I can copy the defect from the database and then generate a map to attach to the delivery order so there’s no question what needs to be done – and where,” he said. “I can also see where repairs are recurring in the track and zero in on the systemic problems I need to concentrate on.” RAILER does this by displaying a wide variety of views focusing on inventory, inspection, condition assessment, M&R planning, and work history.

RAILER also uses hand-held computers and special software called RAILER RED to speed inspections and data entry. A new version is soon to be released and will be beta-tested this spring, said Dr. Don Uzarski, RAILER’s developer at CERL. “With the remote data entry, when your field work is done, your data entry is done, too,” said Boyer.

Hardin finds the greatest advantage to using RAILER is in having valid data to prepare Fort Campbell’s annual M&R plan. “The benefits to installations using RAILER and programs like it are tremendous,” he said. “I love RAILER – it’s a bargain for what we get and how useful it is.”

For more information about RAILER, please contact Dr. Don Uzarski at CERL at (217) 373-4464 or 800-USA-CERL or e-mail d-uzarski@cecer.army.mil. Q



Fort Campbell uses RAILER to keep its railroad track ready to move all equipment and supplies for the 101st Airborne Division.

Take Up the Challenge

Beta testing is underway for PCASE2.0. If you feel up to the challenge log onto www.pcase.com/betatesting and sign up to be a beta tester and a chance to win a free prize (check out the web site for prize details). In order to be eligible for the prize you must submit comments following the 5 testing tasks identified on the web site.

The objectives of the testing are:

- Q Evaluate the software's technical content by calculating known pavement designs and/or evaluations
- Q Evaluate software ease of use, including user interface and reliability
- Q Evaluate user documentation
- Q Identify errors and be able to document the steps necessary to duplicate the error

So sign up today for your chance to win and be part of the PCASE2.0 development. It's a great opportunity for great software.Q

PCASE Workshops Available

So you've downloaded PCASE2.0 and you feel a bit overwhelmed? Come to a PCASE workshop!

To get a glimpse of what we do in the workshops check out the web site at www.pcase.com/workshop.htm. While you are there (on the web site) be sure to register for a workshop – they fill up fast. Be considerate of others - if you find out you can't attend be sure to cancel your reservation to make space for someone else – there is limited seating.

For questions on the software, beta testing or workshops contact Mary Adolf at (402) 221-7265, mary.j.adolf@usace.army.mil or Robert Walker at (601) 634-2145, walkerr@usace.army.mil. Q

Engineer Exterminator Extraordinaire

Jim Lesto, team leader of the pavement evaluation team at the Southern Division, Naval Facilities Engineering Command, is an exterminator extraordinaire. Mr. Lesto was instrumental in the debugging of the evaluation software in PCASE2.0.

Mr. Lesto's evaluation team is responsible for conducting airfield condition surveys, load evaluations, and void detection at 30 airfields in the Navy's Southern Division. Starting in 1994, Mr. Lesto has conducted load evaluations at 17 airfields using a Dynatest's heavy weight deflectometer (HWD) with the purpose of reporting the load carrying capacity of the airfield pavements in terms of Pavement Classification Numbers (PCN) and also for recommending structural improvements. To help interpret the data Jim used PCASE's Layered Elastic Evaluation Program (LEEP). LEEP was also used to calculate PCN's for 13 outlying airfields that support small training aircraft using conservative material properties based on values backcalculated from other evaluations done in the same geographic region.



Jim Lesto, NAVFAC, Southern Division, uses the HWD to evaluate Navy airfield pavements.

In July 2001, Jim's team conducted a load evaluation at Mayport Naval Station, Florida. This is the second load evaluation conducted at Mayport, but the first evaluation to use PCASE2.0 exclusively. PCASE2.0's traffic modules were used earlier for the NAS Key West and NAS Fort Worth evaluations, but since there were still bugs in PCASE2.0 at the time, PCASE1.01 was used for back-calculating modulus and calculating PCNs. Jim Lesto comments, "The Mayport evaluation validated for me that PCASE 2.0 is working. The results are reasonable and compare favorably with the 1994 evaluation. We will use 2.0 on all future evaluations. I am especially pleased with the traffic portion of the program, the navy cumulative traffic option saves me a lot of time."

Jim has been instrumental in the "fine tuning" of the evaluation software in PCASE2.0. The developing team is deeply indebted to Jim for his patience, persistence and time in testing the software and also for sharing his wonderful insights to help produce a premiere product.

Note: Upon official release of PCASE2.0 the Navy will begin distribution of PCASE software on an annual basis to all its users in CD format from the NAVFAC Engineering Innovation & Criteria Office. Q

Plans Underway for TS2004

To share innovative technologies in the design, evaluation, maintenance, and construction of airfields, roads, and railroads in support of DOD operations worldwide is the objective of the next Tri-Service Transportation Systems Workshop to be hosted in 2004. The format and focus of the workshop will be similar to Transportation Systems 2000 Workshop (TS2K) with more in the areas of construction and contingency. If you were at TS2K you know what a great opportunity this was to share information. If you missed TS2K you'll want to be sure to make it to TS2004. Details of the workshop will be posted on a website (currently under development) and future issues of *Transportation News*. Stay tuned for more developments to come your way. Q

Asphalt Airfield Pavement Workshops Available

The FAA and the Asphalt Institute began a four-year program to conduct a series of 3-day workshops across the country focusing on the design, construction, and maintenance of asphalt pavements at airport facilities. Speakers include senior FAA personnel, seasoned Asphalt Institute field engineers, and nationally recognized experts. Additional information about these workshops is available on our website at www.asphaltinstitute.org. Q

www.internet.addresses

www.usace.army.mil/civilworks/cecwe/coexpert/

USACE Centers of Expertise web site provides a current list of all centers and a link to ER 1110-1-8158, *Engineering and Design - Corps-Wide Centers of Expertise Program*. This site provides information on the mission and function of each center, points of contact, and a link to the center's home page.

<http://www.coldregions.org/index.html>

Cold Regions Bibliography Project web site provided by the American Geological Institute (AGI) compiles information from U.S. and overseas scientists, the Cold Regions Research and Engineering Laboratory (CRREL), the National Science Foundation (NSF), and libraries and polar and research institutions worldwide. Site links to *Cold Regions Alert* highlighting current literature from the Cold Regions Research and Engineering Laboratory's Virtual Library.

<http://www.access-board.gov/>

Accessibility Standards and Guidelines for Facilities, Transportation, and Communications by the Access Board (a federal agency committed to accessible design)

Site contains:

- Access guidelines and standards
- Technical assistance, training, and research
- Enforcement
- Publications Q

Calendar of Events

17th Annual Airport Pavement Management Forum and PCI Inspector Training Course

Milwaukee, Wisconsin

1 – 2 May 2002

POC: Charlotte Shelby, (217) 356-4500

2002 FAA Airport Technology Transfer Conference

Atlantic City, New Jersey

5 – 8 May 2002

POC: Caren Centorelli, (703) 820-1395

or carencentorelli@airportnet.org

Asphalt Institute's Airport Pavement Workshop (Design, Construction and Maintenance of Asphalt Pavements)

Raleigh-Durham, North Carolina

20 – 23 May 2002

Asphalt Institute, (859) 288-4964

www.asphaltinstitute.org

27th Int'l Air Transport Conference (ASCE)

Orlando, Florida

30 June – 3 July 2002

www.asce.org/conferences/iatc2002

POC: Cindy Gold, (703) 295-6197 or

e-mail cgold@asce.org

9th Int'l Conference on Asphalt Pavements

Copenhagen, Denmark

17 – 22 August 2002

isap2002@discongress.com

SWIFT (Airfield and Operations) Conference

Calgary, Alberta

8 – 12 September 2002

www.swiftconference.org

3rd World Congress on Emulsions

Lyon, France

24 – 27 September 2002

www.cme-emulsion.com

Asphalt Institute's Airport Pavement Workshop

Fort Worth, Texas

9 – 11 October 2002

www.asphaltinstitute.org

Asphalt Institute, (859) 288-4964 Q

TRANSPORTATION SYSTEMS CENTER

If you have any questions on transportation systems, let us hear from you.

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